

**CODE-BASED OPTICAL NETWORKS, METHODS, AND APPARATUS****Abstract**

Optical communication systems include a central station that encodes data transmitted to multiplexing (mux) stations or user stations.

- 5 The central station also decodes data received from the mux stations or user stations. Encoding and decoding are performed using codes, such as composite codes, that designate sources and destinations for data. The mux stations, user stations, and the central station have address encoders and decoders that use, for example, fiber Bragg gratings to
- 10 encode or decode optical signals according to a code such as a composite code derived by combining codes from one or more sets of codes. A passive optical network comprises one or more levels of mux stations that use such address decoders and encoders to receive, decode, and encode data for transmission toward a central station or a
- 15 user station.